

REMARKS/ARGUMENTS

Claims 1-19 were pending of which claims 1-9 and 14-19 were rejected and claims 10-13 were objected to. Claims 1, 5, 10, 11, 14, and 15, have been amended and claim 4 has been cancelled. Reconsideration is respectfully requested.

Claim Objections

Claims 10, 11, 12, and 13 were objected to as being in improper form. Appropriate amendment has been made. Reconsideration and withdrawal of this objection is requested.

Claim Rejections – 35 U.S.C. §102

Claims 1-9 and 14 were rejected under 35 U.S.C. §102(b) as being anticipated by Higgs (WO 02/29883 A1) (“Higgs”). Reconsideration is respectfully requested.

Independent claim 1 has been amended to recite “annealing a semiconductor structure to diffuse contaminants from a surface particulate into the semiconductor material; after annealing the semiconductor structure, exposing the surface of the semiconductor structure in the vicinity of a surface particulate to at least one high-intensity beam of light from a suitable light source....” Claim 1 further recites “comparing the result ... to identify unacceptable contamination levels resulting from diffusion of contaminants from the surface particulate into the semiconductor structure”. Claim 4, which originally included subject matter related to annealing, has been cancelled. No new matter has been added.

Higgs does not teach or suggest annealing the semiconductor structure. In fact, in the rejection of claims 15, 16, and 17, the Examiner recognized that the disclosure in Higgs fails to specify a heating means and relies on Noguchi et al. (6,730,594) (“Noguchi”) for the disclosure of a heating means.

Nevertheless, Applicant submits that even when Higgs is combined with Noguchi, there is no disclosure of “annealing ... to diffuse contaminants” as recited in claim 1, as Noguchi’s disclosure of a heated stage is only “to control the specimen temperature to 140°” during the measurement of the specimen. Col. 8, lines 30-49. Noguchi does not teach or suggest annealing the specimen. Thus, even if combined, Higgs and Noguchi both fail to teach or suggest “annealing a semiconductor structure to diffuse contaminants from a surface particulate into the semiconductor material” as recited in claim 1.

Moreover, Applicant submits that there is no motivation or reason that Higgs would be modified to anneal the semiconductor structure prior to measurement. By way of example, paragraph [0017] of the present application discusses Higgs and states

The present invention relies on the surprising realisation that these methods can be used not merely to detect lattice contamination inherent in the semiconductor structure for the reasons set out in those references, but is also singularly effective in detecting contamination arising from diffusion of contaminant from surface particulates into the semiconductor structure, and is accordingly singularly effective in providing information about the effect of such particulates in practice which is more relevant to ultimate device performance than direct particulate measurement methods such as those based on particulate size alone.

Thus, Applicants respectfully submit that claim 1 is patentable over Higgs and is patentable over Higgs if combined with Noguchi. Reconsideration and withdrawal of this rejection is respectfully requested. Claims 2-3 and 5 depend from claim 1 and are, therefore, likewise patentable for at least the same reasons.

Originally filed independent claim 6 recites “a heating step to the semiconductor to diffuse contaminant from the particle into the semiconductor material;” “a second step of collecting photoluminescence produced by like method to the first to produce a second photoluminescence result representative of the intensity of the photoluminescence response as above described after annealing”.

Independent claim 14 has been amended to recite “means to heat the sample under test associated with the support to diffuse contamination from a particulate into a semiconductor structure of the sample under test” and a comparator ... to identify unacceptable contamination levels resulting from diffusion of contaminant from particulate into semiconductor structure.” Support for the amendment may be found, e.g., in original claim 15, which has also been amended. Again no new matter is added.

As discussed above, Higgs does not teach or suggest annealing the semiconductor structure or the presence of a means to heat the sample to diffuse contaminants into the semiconductor material. While the Examiner relied upon Noguchi for the disclosure of a “heating means”, this disclosure is insufficient as Noguchi’s heated stage is only “to control the specimen temperature to 140°” during the measurement of the specimen. Col. 8, lines 30-49. Noguchi does not teach or suggest annealing the specimen as recited in claims 6 and 14.

Moreover, as discussed above, there is no motivation or reason to modify Higgs to perform an annealing step. Thus, Applicants respectfully submit that claims 6 and 14 are patentable over Higgs and is patentable over Higgs if combined with Noguchi. Reconsideration and withdrawal of this rejection is respectfully requested. Claims 7-8 depend from claim 6 and are, therefore, likewise patentable for at least the same reasons.

Claim Rejections – 35 U.S.C. §103

Claims 15, 16, and 17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Higgs in view of Noguchi et al. Reconsideration is respectfully requested.

Claim 15 depends from independent claim 14, discussed above. It is respectfully submitted that claim 15 is patentable over Higgs in view of Noguchi for at least the same reasons that claim 14 is patentable over the combination as discussed above.

Independent claim 16 recites “allowing a photoluminescence response to be measured before and after heating”. As discussed above, Noguchi discloses a heated stage that is only “to control the specimen temperature to 140°” during the measurement of the specimen Col. 8, lines 30-49. Noguchi does not teach or suggest measuring the sample **before and after** heating as recited in claim 16.

Moreover, the Examiner states that Noguchi is from the same field of endeavor. Applicant respectfully disagrees. Noguchi discloses the use of a “current/voltage measuring instrument (I/V measuring instrument)”. Col. 8, lines 28-30. While Noguchi involves a measuring instrument, it does not relate to photoluminescence as recited in claim 16, and thus, Applicant submits that it is really outside the field of endeavor. For example, the heating stage in Noguchi is used so that the I/V measuring instrument can determine Time Dependence on Dielectric Breakdown (TDDB) while the specimen is held at a temperature of 140°C. Col. 8, lines 47-49. Photoluminescence, however, is a completely different measurement device that operates by a completely different mechanism (e.g., photoluminescence is an optical metrology technique, while I/V measuring uses voltages and currents through pads on the sample). Thus, Applicant submits that there is no rational basis to use Noguchi’s heated stage, which is for I/V measuring instruments to determine TDDB at a specific temperature, with a photoluminescence device as described in Higgs, which does not determine TDDB at a specific temperature.

Thus, Applicants respectfully submit that claim 16 is patentable over Higgs in view of Noguchi. Reconsideration and withdrawal of this rejection is respectfully requested. Claims 17-19 depend from claim 16 and are, therefore, likewise patentable for at least the same reasons.

Claims 1, 5, 10, 11, 14, and 15, have been amended and claim 4 has been cancelled. leaving claims 1-3, 5-19 pending. For the above reasons, Applicants respectfully request allowance of all pending claims. Should the Examiner have any questions concerning this response, the Examiner is invited to call the undersigned at (408) 378-7777 ext 112.

Respectfully submitted,



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